Nathan Louie

University of Texas, Austin | PMA 11.108 | nalouie@utexas.edu | [website](#)

RESEARCH INTEREST

My interests are broadly in low-dimensional topology, particularly in 4-dimensions.

EDUCATION

University of Texas Austin — Austin, TX
Doctor of Philosophy in Mathematics — *Aug. 2024 - Present*

University of Washington: 3.95 — Seattle, WA
Bachelor of Science in Mathematics with Distinction: 3.96
Honor Thesis: "Chern-Gauss-Bonnet Theorem"
Bachelor of Science in Computer Science: 3.91 — *Sept. 2021 - June 2024*

EXPERIENCE

University of Texas — Austin, TX
Mathematics Mentor — *Aug 2024 – Present*
- Mentored and tutored UT undergraduate students individually in a directed reading group on advanced topics in mathematics, particularly in algebra, topology, and geometry.
- Organized weekly hour-long meetings, assigned readings, and practice problems, and provided guidance and feedback on students' progress.

University of Washington — Seattle, WA
Undergraduate Researcher — *Sept 2023 – March 2024*
- Applied Lean, a proof assistant and a functional programming language, to formalize mathematical results.
- Participated in collaborative discussions to design a foundational framework to base proofs of related topics on.
- Formally proved the Witt's Cancellation Theorem from quadratic form theory in addtion to basic results on transfer systems from homotopical combintorics.

Northwestern University — Evanston, IL
Undergraduate Researcher — *June 2023 – Aug 2023*
- Proved the existence of a smooth Anosov action on the 3-torus and other nilmanifolds by surface groups. Further, we explored properties surrounding it, including structural stability and an Anosov $PSL(2, Z)$ action.
- Applied Mathematica and other mathematical coding softwares to create visual and computational models for such Anosov actions on the 3-torus.

ADDITIONAL INFORMATION

Conferences/Summer Schools Attended: SU UnKnot Conference *2024*, UGA Summer School on Topology *2024*, NU Summer School on Dynamical Systems *2023*

Talks Attended: UT Sophex Seminars *2024*, UT Topology Seminars *2024*, UT Junior Topology Seminars *2024*, Skein Lasagna Module Seminar *2024*, UW-PIMS Colloquium Series *2022-2024*, and K-OS Knot Online Seminar *2024*.

Outreach: UT Austin Directed Reading Group Mentor *2024*, Meet a Mathematicians Panelist *2024*, UW ath Hour Olympiad Judge *2023*, UW Undergraduate Reading Group Mentor *2023-2024*, and UW Undergraduate Journal Peer Reviewer *2022-2024*.

Awards: Dean's Strategic Fellow. *2024*, Wisniewski Endowed Sch. *2024*, BAVA Sch. *2021-2024*, WSOS Sch. *2021-2024*, and HS Valedictorian.

Programming Skills: Java, Python, C, C++, SQL, LaTeX, Mathematica, Sage, GAP, and Lean.

Languages: English *native*, Cantonese *native*, Japanese *intermediate*.

Reading Groups Attended: Low-Dimensional Topology Bootcamp *2024*, Topological Quantum Field Theory *2024*, Topos Theory *2024*, Grad. Topology Prep *2022*, Grad. Algebra Prep *2021*, Grad. Analysis Prep *2021*